

## Objective

Maximize profit by minimizing revenue loss under sudden 20% demand surge while facing raw material constraints.

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## Problem Statement

Unfulfilled orders due to an unexpected 20% increase in demand across all 5 SKUs, production is constrained by limited raw material capacity.

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## Scenario Analysis

**Step 1:** Identify the Constraint

Two raw materials are required:

- RM1
- RM2

**After capacity comparison:**

Required RM1 = 37,800 units

Available RM1 = 32,000 units

● **RM1** is the bottleneck (**Limiting Factor**).

RM2 capacity is sufficient.

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**Step 2:** Allocation Strategy

To maximize profitability under constraint:

- SKUs sorted by Contribution Margin
- RM1 allocated to highest margin SKUs first
- **SKU2** flagged as risk item:
  - Lowest contribution margin
  - Highest RM1 consumption per unit
  - Low profit efficiency per unit of RM1
- **This makes SKU2 the least attractive during shortage.**

## Findings

- **Level Achieved:** 91%
- All other SKUs fully served
- Profit maximized under constraint

**We sacrifice low-margin SKU to protect high-margin portfolio.**

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## Business Interpretation

- Instead of spreading shortage across all SKUs and hurting revenue everywhere, we concentrate on the impact on lowest profit item.
  - This increases total contribution margin compared to equal distribution strategy.
  - This is a classic Theory of Constraints decision.
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## Action Plan to Prevent Recurrence

### 1 Short-Term Actions

- Confirm reason for demand spike:
    - Promotion?
    - One-time order?
    - Market trend shift?
  - Evaluate possibility of:
    - Expedited RM1 purchase
    - Alternate supplier
    - Temporary subcontracting
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### 2 Medium-Term Actions

If demand shift is structural:

- Increase RM1 safety stock
  - Revise capacity planning
  - Introducing buffer stock policy
  - Review forecast accuracy
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### ③ Long-Term Actions

- Develop dual sourcing for RM1
  - Conduct bottleneck analysis quarterly
  - Introducing dynamic allocation model
  - Build demand sensing system
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### Strategic Insight

Current model optimizes profit.

**But future improvement could include:**

- Protecting strategic SKUs
  - Hybrid allocation model (profit + fairness)
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### Conclusion:

Under constrained conditions, the objective is not to fulfill all demand, but to maximize contribution margin per unit of constrained resource.

**By prioritizing high-margin SKUs, we achieve 91% service level while protecting overall profitability.**

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